

**THE FIGHTER PILOT CHALLENGE: IN THE BLINK OF AN EYE**

To be a fighter pilot you must have very fast reactions – travelling at speeds of over 2500 km per hour (twice the speed of sound) means about 700m every second! So splits of a second can make all the difference, you blink your eyes and you’ve moved an incredible 140m! Could you respond to outside events with minimal delay and take appropriate action... let’s test your reaction time?

The simple experiment described on this page is dead simple, you tests the time it takes to react to catch a falling ruler. Just make sure it isn’t a metal ruler ...it could seriously injure your foot!

The test requires two people...

**INSTRUCTIONS**

- i) Get a 30cm ruler...
- ii) One person holds the ruler near the 30cm mark and lets it hang vertically...
- iii) The other person places their thumb and index finger either side of the 0cm mark ready to catch it when it falls - their fingers shouldn’t touch the ruler.
- iv) Without warning the person holding the ruler lets go and the subject tries to catch the ruler as soon as possible.  
*[Hint: To prevent guessing, vary the time before letting go of the ruler].*
- v) The level (in cm) just above the subject’s first finger where the ruler was caught is recorded.
- vi) The same person is tested 5 times and then calculate the mean average of their results (add all five numbers together and then divide by five).
- viii) Now swap over and test your partner.

Directions: create the chart below. Turn in at the end of the period.

# of Trials- Centimeters						
Person’s Last Name	1	2	3	4	5	Average

**The Science Of Catching The Ruler**

The eye sees the ruler drop.

The eye sends a message to the visual cortex.

The visual cortex sends a message to the motor cortex.

The motor cortex sends a message to the spinal cord.

The spinal cord sends a message to the hand/finger muscle. The finger muscle contracts to catch the ruler.

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### How Did You Do?

From the table below, the 'mean catch distance' on the ruler can be converted into a 'mean reaction time' in milliseconds (Remember: 1 millisecond is one thousandth of a second).

#### DISTANCE – REACTION TIME CONVERSION TABLE

Catch Distance (cm)	Reaction time (milliseconds)	Catch Distance (cm)	Reaction time (milliseconds)
1	50	16	180
2	60	17	190
3	70	18	190
4	80	19	200
5	90	20	200
6	100	21	210
7	120	22	210
8	130	23	220
9	140	24	220
10	140	25	230
11	150	26	230
12	160	27	230
13	160	28	240
14	170	29	240
15	170	30	250

So what does your reaction time mean – are you fast enough for an F-16?

#### REACTION TIME RATING

<u>Reaction time</u> (milliseconds)	<u>Rating</u>	<u>Comment</u>
0-50	Ultra-fast	A clairvoyant catcher... are you cheating?!
50-130	Superb	Impressive, do you play computer games? Next stop, F16!
131-175	Excellent	Well done, are you a text messenger?
176-200	Good	Keep trying, you're not top gun yet!
201-240	Average	Not bad – but you're just Joe Average.
241-250	Fair	You'd get faster if it were money instead of a ruler!
251+	Slow	...ouch! Did the ruler hit your foot? Keep trying!

**Remember...** Milliseconds are one thousandth of a second. This means that:

One second (s) = 1000 milliseconds (ms)

Half of a second (0.5s) = 500 ms

A quarter of a second (0.25s) = 250 ms

One tenth of a second (0.1s) = 100 ms

### Curiosity Zone – Time To Experiment

After you've tested yourself, why not experiment further. Here's a few suggestions, do reaction times vary:

- for people of different ages (children versus adults)?
- if you use your dominant hand versus non-dominant hand?
- if you are tired or alert?
- for men or women?
- depending on your mood?
- after an alcoholic drink?

### Curiosity Zone – Time For Some Answers

- generally the older you are the longer your reaction time (that ruler keeps hitting my foot!)
- as you might expect, the dominant hand has a faster reaction time.
- in 'Catch the ruler', it helps to pay attention – so being alert is a great asset.
- who is faster 'men or women'? ...you tell me?
- mood affects attention and therefore reaction times.
- alcohol greatly increases reaction times.

### Could You Fly The Plane As Well?

A final thought:

Can you imagine doing several tasks together, each requiring fast reaction times with high precision, whilst at the same time concentrating on steering a jet plane - for example as part of an aerobatic team at the Paris air show?



A lot to contend with, without 9g on top: The F-16 flight controls. Image: Lockheed Martin